APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,644	11/26/2003	Laurent Stefani	144724	7327

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EXAMINER
CHENG, JACQUELINE

ART UNIT	PAPER NUMBER
3768	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 February 2008*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Response to Arguments

1.　　Applicant's arguments, see pages 9-19, filed February 28, 2008, with respect to the

rejection(s) of independent claim(s) under 103(a) have been fully considered and are persuasive.

Therefore, the rejection has been withdrawn.　However, upon further consideration, a new

ground(s) of rejection is made in view of the addition of Clark (US 6,174,285 B1) (paragraph 7

in italics below).

Claim Rejections - 35 USC § 103

2.　　The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains.　Patentability shall not be negatived by the
> manner in which the invention was made.

3.　　**Claims 1, 2, 9-13, 17, 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over

Drummond (US Patent 6,628,743 B1) in view of Devito (US Patent No. 5,421,331) in view of

Clark (US 6,174,285 B1).

4.　　Drummond discloses a method for acquiring and analyzing cardiac data of a patient in

which a cardiac 3D dataset (from any well known medical scanner such as a CT with a detector

array, radiation source and a workstation coupled to a computer) is received and is processed by

various algorithms, one being a region growing algorithm, to determine a volume of a ventricle

of a heart. This volume rendering can be done at any specified phase of the cardiac cycle (which

to process the volume at any of the specified phases, a selection of the phase must first be

received). This volume rendering is one of the cardiac datasets that are collected to use to help to

diagnose the heart for heart diseases such as myocardial perfusion analysis (abstract, col. 1 line

46-53, col. 3 line 13-50, col. 5 line 16-21, col. 9 line 46-57).

5.   What Drummond does not disclose is calculating at least one of a short axis or long axis

without user intervention. Drummond does disclose depicting short axis and long axis images, so

to depict these images the short and/or long axis must be known. This might be done, for

example if the diagnosis of the heart consists of a myocardial perfusion analyses. In myocardial

perfusion analyses it is conventional practice to reference the position of a tissue region to the

long axis of the left ventricle. Devito discloses that to automate this process would improve the

diagnostic utility of a myocardial perfusion study, so therefore it would be obvious to one skilled

in the art to combine Devito with Drummond in order to further the diagnostic utility of

Drummond by determining the long axis without user intervention through Devito (Devito, col. 1

line 31-47).

6.   Devito discloses automatically identifying the long axis of the left ventricle to improve

the diagnostic utility of a myocardial perfusion study from a 3D dataset (col. 1 line 44-47) with a

program that runs on a computer. The computer does this by first identifying the entire heart

from the 3D image data and segments out the left ventricle by reconstructing a set of transverse

slices of it. A representative slice of the left ventricle is then selected and a first estimate of the

long axis is determined. The computer then identifies and constructs line segments from the local

maxima and local minima. The resulting line, element 44 of fig. 6, shows the first estimate. The

second estimate is then taken by using the calculated maxima and minima to determine points in

which to fit a line through their centers for the second estimate of the long axis (col. 4 line 48-

col. 5 line 40).

7.   Neither Drummond nor Devito discloses the new claim limitations of selecting a layout

for displaying views and automatically producing a set of images based on the 3D dataset and

the selected layout. However this would be obvious to one skilled in the art to do and add such as

disclosed by Clark. Clark discloses a system that acquires 3D images of the heart. A user selects

a set of pre-set anatomical views (selecting a layout) that they want to be displayed. The

processor then automatically produces the 3D images of the anatomical view and displays them.

It would be obvious to add and combine Clark with Drummond and Devito in order to further

the utility of the patents so to speed the process of producing the images of the desired region of

interest and allow for a more real time view.

8.   **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Drummond in

view of Devito in view of Clark as applied to claim 1 above, and further in view of US

Publication No. 2003/0153823 A1 (herein referred to as Geiser). Geiser discloses that the long

axis of a heart can include the aorta and the atrium as well as the ventricle (paragraph 0027).

Therefore it would be obvious to one with ordinary skill in the art at the time of the invention to

segment out the atrium and aorta along with the left ventricle as the area to be identified, the long

axis, could includes areas of the aorta and atrium. It would be obvious to one skilled in the art at

the time of the invention to combine Geiser with Drummond and Devito to further the utility of

determining the long axis.

9.   Claims 4-8, 14-16, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Drummond in view of Devito in view of Clark as applied to claims 1 and 12 above, and

further in view of US Patent No. 6,217,520 B1 (herein referred to as He). It would be obvious to

one with ordinary skill in the art at the time of the invention to combine He with Drummond and

Devito as the inventions are to the same art of automatic extraction of an object of interest from

the heart and would make Devito more useful by producing an accurate border of the heart.

10.   **Claims 4 and 14:** He discloses that the images can be taken at the end of diastole period,

which would be close to 75% of an R to R interval (col. 7 line 54-57).

11.   **Claim 5, 6, 15, and 19:** He discloses that it is well known in the art to use an axis of

inertia to estimate the long axis. This is done through calculating the axis of least second

momenta which is the axis of least inertia (col. 6 line 40-67). So although Devito discloses

determining the first estimate by using local maxima and local minima, it would be obvious to

use any type of estimate of the long axis such as an estimate using the axis of inertia. As for

selecting a right extremity point as the first point for the second estimate, the right most point

depends on the orientation of the heart and the image. If the image of the slice is viewed as the

heart is orientated, with the open u part (where the aorta and atrium connect above the ventricle)

at the top, the midway point of the line connecting the ends of the maxima (element 52 of fig. 8)

is the right extremity point.

12.   **Claims 7, 8, 16, and 20:** Devito et al. discloses that after the centerline is determined, it

is known that the long axis lies in a plane that includes this centerline. This plane is

perpendicular to the transverse slice and so the image is resliced along the determined plane,

resulting in sagittal slices. The selected sagittal slice used would have the center of inertia for

that point must lie along the long axis. The centerline of the new slice is then estimated and this

new long axis estimate is combined with the transverse long axis estimate to determine the long

axis location (col. 5 line 58-col. 6 line 27).

Conclusion

13.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to JACQUELINE CHENG whose telephone number is (571)272-

5596. The examiner can normally be reached on M-F 10:00-6:30.

14.   If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Brian Casler can be reached on 571-272-4956. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

15.   Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Brian L Casler/
Supervisory Patent Examiner, Art Unit
3737

JC